

**REMARKS**

The specification is amended to correct a typographical error by replacing the term “60□C” on page 13, line 19, which is an obvious error, with 60°C, which is obviously the appropriate correction to indicate a temperature of 60 degrees Celsius.

Entry of the amendment is respectfully requested.

**I. Response to Rejection Under 35 U.S.C. § 112, 1<sup>st</sup> Paragraph, and Objection under 35 U.S.C. § 132**

Claims 1, 2, 6, 7, 11 and 12 are rejected under 35 U.S.C. § 112, first paragraph, as allegedly containing subject matter which allegedly was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention based on the amendment to the claims replacing the term “weight average molecular weight” with “molecular weight”.

Further, the amendment to the specification replacing the term “weight average molecular weight” with “molecular weight” is objected to under 35 U.S.C. § 132 as allegedly introducing new matter into the application.

The Examiner’s position is that the introduction of the term “molecular weight” instead of the previously recited term “weight average molecular weight” is not supported by the original specification. Specifically, the Examiner asserts that the instant specification provides for a “weight average molecular weight” and does not mention or provide guidance for the term “molecular weight”.

This rejection and objection are respectfully traversed. Applicants respectfully submit that the original specification provides literal support for the presently claimed invention and amendment to the specification. First, Applicants note that the original specification provides literal support for the term “molecular weight” as recited in the amended claims. For example, on page 6, lines 15-16 it states, “the resulting acrylic polymer has a high molecular weight with a reduced low molecular component content . . .”(emphasis added) and on page 8, lines 18-20, it states, “an acrylic pressure-sensitive adhesive having very less low molecular weight components can be obtained” (emphasis added). Therefore, contrary to the Examiner’s statements, the original specification does mention and provide support for the term “molecular weight” in describing the low molecular weight components.

The claims and specification were amended to correct an obvious error in the description of “weight average” molecular weight in other locations. It is well settled that an amendment to correct an obvious error is not considered as new matter where one skilled in the art would recognize the existence of the error and the appropriate correction thereof. See *In re Oda*, 443 F.2d 1200, 1204 (CCPA 1971) (“That amendments may be made to patent applications for the purpose of curing defects, obvious to one skilled in the art, in the drawings or written descriptions of inventions, is so well settled that we deem it unnecessary to cite authorities in support thereof.”) See also, MPEP § 2163.06(II).

In this case, claims 1, 2, 6, 7, 11 and 12 and the specification were amended to correct an inadvertent error in referring to a “weight average molecular weight” with respect to the amount of the low molecular weight components, i.e., having a molecular weight 100,000 or less. These

amendments are consistent with the specification as filed, in view of the literal support in the original specification for the term “molecular weight” used in its proper context in relation to low molecular weight components of the acrylic polymer, as discussed above, and in view of the overall teachings in the disclosure as a whole.

It is clear that an error was made in certain locations when the disclosure is considered overall. For instance, in the disclosure of the original specification, it is indicated in that the aim of the present invention is to narrow the molecular weight distribution and reduce the “*proportion of the amount of low-molecular [weight] components*” that can hinder pressure-sensitive adhesive properties and increase components that may be transferred to an adherend and cause contamination. See specification, page 2, lines 19-25 (emphasis added).

Further, it is clear from the examples in the original specification that the terms “weight average molecular weight” and “molecular weight” have different meanings. For example, Example 1 refers to the bulk polymer having a weight average molecular weight of 1,020,000 (see page 10, lines 26-27), so it does not make any sense for the example to subsequently refer to the specific components thereof as having a weight average molecular weight of 100,000 or less (see page 11, lines 1-2). The skilled artisan would recognize that the components are discussed in terms of their actual molecular weight. This is consistent throughout the examples.

In addition, it is clear that the disclosure of 100,000 or less in the original specification refers to a range of molecular weights, such as a portion of Fig. 1-3 in Billmeyer starting from the left side of the x-axis (the molecular weight axis) and moving to a molecular weight of 100,000. The requirement in the claims of having 10% by weight or less of components having

a molecular weight of 100,000 or less is similar to the EPA's PMN requirement of a weight % below 500 molecular weight and a weight % below 1000 molecular weight.

In addition, the term "molecular weight" is a term of art recognized by those of ordinary skill in the art to refer to relative molecular mass, which is obtained by adding together the atomic weights of the formula of the substance; or is determined by chemical or physical methods, such as lowering of freezing point, vapor pressure or vapor density. See Grant & Hackh's Chemical Dictionary, 5<sup>th</sup> Ed. 1987, page 375, which is attached for the Examiner's convenience. This definition of the term "molecular weight" is consistent with the use of the term in the original specification and as amended, as would be understood by one of ordinary skill in the art for the reasons discussed above.

Thus, "molecular weight" is an appropriate term to describe the physical properties of polymer components or building blocks. In contrast, "weight average molecular weight" is a term used to describe the distribution of a polymer *per se* as discussed further below. See, e.g., US Pat. Nos. 6,194,498 and 6,586,525. Thus, one of ordinary skill in the art would have readily recognized the amendment to change the term "weight average molecular weight" to "molecular weight" as the appropriate correction to correct the obvious error in the description of the polymer components as opposed to the polymer as a whole.

In view of the above, one skilled in the art, upon reading the original specification, would have understood that the term "weight average molecular weight," was incorrect in the amended locations and that "molecular weight" is the proper term from the context of the specification.

Therefore, the presently claimed invention is adequately described in the specification as originally filed in view of the fact that (1) the term “molecular weight” in describing the polymer components is literally supported in the original specification as filed; (2) it is clear from the overall disclosure as originally filed that the specification as amended was intended to refer to “molecular weight” as opposed to “weight average” molecular weight in describing the polymer components; and (3) the term “weight average molecular weight” is an obvious error in the amended locations and the term “molecular weight” is an appropriate correction as is readily recognized by one of ordinary skill in the art.

Accordingly, Applicants respectfully request that the rejection under 35 U.S.C. § 112, 1<sup>st</sup> paragraph, be reversed and the objection under 35 U.S.C. § 132 be withdrawn.

## **II. Response to Claim Rejections Under 35 U.S.C. § 112, 2<sup>nd</sup> Paragraph**

Claims 1, 2, 6, 7, 11 and 12 are further rejected under 35 U.S.C. § 112, 2<sup>nd</sup> paragraph as allegedly being indefinite based on the amendment to the claims replacing the term “weight average molecular weight” with “molecular weight”. The Examiner states that the term “molecular weight” does not identify whether the recited molecular weight is determined based upon weight average, number average or viscosity average.

Applicants respectfully traverse the rejection for the following reasons.

As discussed above with respect to the rejection under 35 U.S.C. § 112, 1<sup>st</sup> paragraph, claims 1, 2, 6, 7, 11 and 12 and the objection to the specification under 35 U.S.C. § 132, the claims and specification were amended in this case to correct an inadvertent, obvious error in certain locations in referring to a “weight average molecular weight” with respect to the amount

of the low molecular weight components, i.e., having a molecular weight 100,000 or less, which is consistent with and supported by the specification as filed. Based upon the plain language of the claims, it is readily understood by one of ordinary skill in the art that the term “weight average molecular weight” is incorrect and the term “molecular weight” is the appropriate correction to properly describe the low molecular weight components having a molecular weight of 100,000 or less. The term “molecular weight” is art-recognized, and has a definite meaning. See Grant & Hackh’s Chemical Dictionary at 375. Further, it is indicated in the original disclosure that *the aim of the present invention is to narrow the molecular weight distribution and reduce the “proportion of the amount of low-molecular [weight] components* that can hinder pressure-sensitive adhesive properties and increase components that may be transferred to an adherend and cause contamination. See specification, page 2, lines 19-25 (emphasis added). Therefore the definition of low molecular weight components having a molecular weight of 100,000 or less is consistent with the disclosure in the specification in that the number of these components having a molecular weight of less than 100,000 as opposed to a “weight average molecular weight” (which as shown on the GPC (gas permeation chromatography) chart below includes those having a molecular weight of 10,000,000”). Thus, when the claims are properly read in light of the specification, it is readily recognized by one of ordinary skill in the art that the proper term is “molecular weight” as recited in the present claims.

The term “molecular weight” refers to a measure of the size of a molecule and in the case of a specific molecule, its molecular weight is unequivocally determined (for example, methanol: 32, ethanol: 46, etc.). On the other hand, a polymer is an aggregate of molecules having different

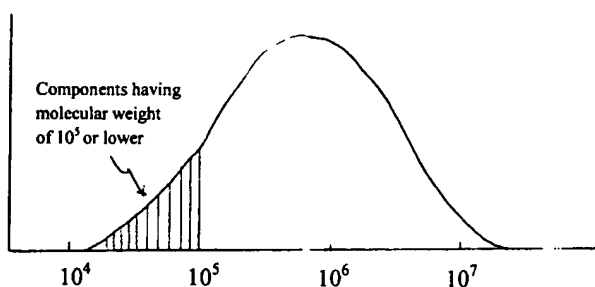
degrees of polymerization, and comprises molecules having various molecular weights.

Therefore, the “molecular weight” of a polymer having a specific degree of polymerization can clearly be expressed, but to express the molecular weight of a polymer as a whole, the average value of the molecular weights is employed, and “weight average” molecular weight is one expression for an average value. Thus, the molecular weight of the “components having a molecular weight less than 100,000 or less” is appropriately defined as “molecular weight,” not as a “weight average” molecular weight because it refers to the amount of polymer components having a molecular weight of  $10^5$  or lower that are present with respect to the entire polymer.

It is clear that the meaning intended throughout the specification and claims in the present application is the *amount of polymer molecules having a molecular weight of  $10^5$  or lower that are present with respect to the entire polymer* (see, GPC chart below) which is consistent with the disclosure and as is clear to one of ordinary skill in the art. As indicated in the original specification, the aim of the present invention is to narrow the molecular weight distribution and reduce the “*proportion of the amount of low-molecular [weight] components*” that can hinder pressure-sensitive adhesive properties and increase components that may be transferred to an adherend and cause contamination. GPC is generally used to measure the molecular weight distribution of a polymer. In the GPC chart below, the proportion of an area corresponding to the molecular weight of 100,000 or less is calculated from the GPC chart (curve). In other words, the components having a molecular weight of 100,000 or less in the present invention include all polymers present in an area of a border line of a molecular weight of 100,000 or lower. The molecular weight of 100,000 is the border line and must be expressed as a specific

molecular weight. If the molecular weight is expressed as an “average” molecular weight, the border line would be unclear since the term “average molecular weight” would include polymers having a molecular weight higher than 100,000, by virtue of the definition of the term average.

GPC chart: weight average molecular weight of entire polymer =  $10^6$



Thus, the Examiner's position that the term “molecular weight” as presently recited in independent claims 1 and 6 should be “weight average”, “number average” or “viscosity average” is incorrect. When reading the claims, as amended, in view of the specification as a whole, one of ordinary skill in the art can readily ascertain the meaning and scope of the claimed invention as claimed and therefore the claimed invention is adequately defined.

To further show that the term “molecular weight” by itself is art-recognized in the context used in Applicants' specification, Applicants refer to US Patent Nos. 6,194,498, 6,444,772, 6,586,525 and 6,610,800 (copies enclosed), which employ the term “molecular weight” as used in the present specification, and which establish a distinction between the terms “weight average molecular weight” and “molecular weight”.

For example, in US Patent No. 6,194,498, the term “weight average molecular weight” is discussed in relation to determining the polydispersity, or molecular weight distribution, of a



polyurethane which has a combination of “relatively high molecular weight polymers” and a substantial portion of “relatively low molecular weight polymers” (emphasis added). See col. 5, lines 42-48. Polydispersity is defined as the number derived from dividing the “weight average molecular weight” by the number average molecular weight at col. 5, lines 55-57 and the low and high “molecular weight” portions are described as being based on “weight basis”. See col. 6, lines 3-6.

US Patent No. 6,444,772, which was cited by the Examiner, is another example wherein the “molecular weight” of various polymers is disclosed in col. 2, lines 51-66 and in Tables I, II and III.

US Patent No. 6,586,525 is an example of a patent where the term “molecular weight” is recited in the claims. See claims 1, 18 and 19. The invention relates to a composition that contains “not more than 2% of a component with molecular weight of 2,000 or lower and which has a ratio of weight average molecular weight (Mw) to number average molecular weight (Mn) . . .” emphasis added). See Abstract. It is also disclosed that the content of the “lower molecular weight component with weight average molecular weight (Mw) to number average molecular weight (Mn), that is, Mw/Mn were determined by means of gel permeation chromatograph (GPC), using polystyrene with a known molecular weight and narrow molecular weight distribution” (emphasis added). This issued patent is directly analogous to the use of terminology in the present application.

US 6,610,800 is an example wherein it is disclosed that “molecular weight determination is deduced by using narrow molecular weight distribution standards” (emphasis added). US

6,610,800 also discloses that the polydispersity index is typically measured by GPC (col. 7, lines 46-47); how equivalent polyethylene molecular weights can be determined (col. 7, lines 55-64); and how weight average molecular weight can be calculated using the weight fraction ( $w_i$ ) and molecular weight ( $M_i$ ) derived from the GPC column. (col. 7, line 65- col. 8, line 5).

In view of the above exemplary US patents, Applicants submit that the term “molecular weight” is art-recognized and commonly used and understood by those of ordinary skill in the art. In addition, the disclosure of these patents regarding the terms “polydispersity”, “molecular weight distribution”, “molecular weight”, “weight average molecular weight” and “number average molecular weight” are consistent with the disclosure in Applicants’ specification as well as the arguments and evidence previously made of record.

In this regard we refer to the references previously submitted with the Amendment filed on September 22, 2003. For example, the x-axis in Fig. 1-3 on page 17 of Billmeyer, Textbook of Polymer Science, 3<sup>rd</sup> Ed., is simply labeled “Molecular Weight,” and the figure is described as showing the distribution of “molecular weights.” On page 41 in Stevens, Polymer Chemistry, 2<sup>nd</sup> Ed.,  $M$  is the “molecular weight” of a species  $i$ . At the bottom of page 41, Stevens gives an example in which a polymer sample consists of 9 mol of molecular weight 30,000 and 5 mol of molecular weight 50,000, with these molecular weights being used to calculate a number average molecular weight of 37,000. Page 5 of the Environmental Protection Agency’s Premanufacture Notification (PMN) form requires the maximum weight % below “500 molecular weight” and “1000 molecular weight.” All these examples are instances where the term “molecular weight” itself is used distinct from “weight average molecular weight.” Thus, the term “molecular

weight” by itself is well known in the art and not indefinite and when properly read in light of the specification, one of ordinary skill in the art would be able to readily ascertain the meaning and scope of the claims.

Accordingly, Appellants respectfully request withdrawal of the rejection.

### **III. Response to Claim Rejections Under 35 U.S.C. § 103**

Claims 1, 2, 6 and 7 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Bamba et al (U.S. 6,224,938).

Applicants respectfully submit that the Examiner has not made a *prima facie* showing of obviousness since Bamba does not teach or suggest all elements of the claimed invention.

First, Bamba does not disclose or suggest the step of uniformly mixing a monomer mixture and an inert fluid and feeding the resulting mixture to a continuous reactor.

The claimed process is directed to a production process wherein a monomer mixture and an inert fluid are previously mixed uniformly by a line mixer, the resulting mixture is supplied to a continuous reactor, and polymerization is performed therein. Bamba does not contain any disclosure to teach this production process and therefore does not teach or suggest this element of the claimed invention.

Further, Bamba does not teach or suggest Appellants’ claimed reaction parameters as admitted by the Examiner. As the Examiner points out in the Office Action dated November 25, 2003, Bamba does not disclose the claimed polymerization time or the features of the apparatuses for polymerization as recited in the present claims. It is the Examiner’s position that the recitation of structural limitations of the apparatus for performing the recited steps of the

process do not serve to limit the claim and that the time and temperature parameters recited in the claim are result effective variables that are conventionally adjusted to achieve optimum performance.

Appellants respectfully submit that a variable must be recognized as contributing to a specific result before it can be acknowledged as *prima facie* obvious to determine the optimum or workable range of the variable. See MPEP §2144.05(II)(B) citing *In re Antonie*, 559 F.2d. 618 (CCPA 1977). In this case, Bamba does not teach suggest or even recognize the significance of the claimed reaction parameters in achieving the claimed pressures-sensitive adhesive of the present invention.

A characteristic feature of the present invention is the production of an acrylic pressure-sensitive adhesive comprising 10% by weight or less, based on the weight of the total monomers, of components having a molecular weight of 100,000 or less, which is accomplished by the recited . Bamba is asserted to disclose that “the residual monomer and low molecular weight components, which have the possibility to lower the pressure-sensitive adhesive properties, can be evaporated off”. However, Bamba discloses that those low molecular weight components are evaporated off simultaneously with the evaporation of the inert fluid, and the molecular weight is considerably smaller (generally, several hundreds). By contrast, the polymer adhesive obtained in the present invention contains a small amount of components having a molecular weight of 100,000 or less. Thus the claimed invention differs considerably from Bamba.

Bamba does not disclose or suggest a production process wherein a monomer mixture and an inert fluid are previously mixed uniformly by a line mixer, the resulting mixture is

supplied to a continuous reactor, and polymerization is performed therein. Specifically, Bamba does not disclose the process recited in claim 1, wherein the continuous bulk polymerization process is carried out at a polymerization temperature of 50 to 180°C for a residence time of 0.5 to 60 minutes in a continuous reaction zone of the reactor. Further, Bamba does not disclose the process recited in claim 6, t wherein the continuous bulk polymerization process is carried out at a polymerization temperature of 50 to 100°C for a residence time of 60 to 200 minutes in a continuous reaction zone of the reactor. Therefore the Examiner has not set forth a *prima facie* showing that it would have been obvious to one of ordinary skill in the art to achieve the claimed invention based on the disclosure of Bamba.

Accordingly, it is respectfully requested that the rejection be withdrawn.

#### **IV. CONCLUSION**

I view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

AMENDMENT UNDER 37 C.F.R. § 1.111  
U.S. Appln. No.: 09/918,532

Attorney Docket No. Q65685

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

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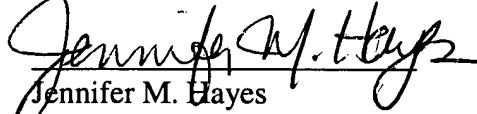
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**23373**

CUSTOMER NUMBER

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